

CLAIMS

What is claimed is:

5

1. A compound of formula (I),

$$(R^2R^3)-A^7-A^8-A^9-A^{10}-A^{11}-A^{12}-A^{13}-A^{14}-A^{15}-A^{16}-A^{17}-A^{18}-A^{19}-A^{20}-A^{21}-A^{22}-A^{23}-A^{24}-A^{25}-A^{26}-A^{27}-A^{28}-A^{29}-A^{30}-A^{31}-A^{32}-A^{33}-A^{34}-A^{35}-A^{36}-A^{37}-A^{38}-A^{39}-R^1$$
,

(I)

10 wherein

A^7 is L-His, Ura, Paa, Pta, Amp, Tma-His, des-amino-His, or deleted;

A^8 is Ala, β -Ala, Gly, Ser, D-Ala, Aib, Acc, N-Me-Ala, N-Me-D-Ala or N-Me-Gly;

A^9 is Glu, N-Me-Glu, N-Me-Asp or Asp;

A^{10} is Gly, Acc, β -Ala or Aib;

15 A^{11} is Thr or Ser;

A^{12} is Phe, Acc, Aic, Aib, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, Cha, Trp or $(X^6, X^7, X^8, X^9, X^{10})Phe$;

A^{13} is Thr or Ser;

A^{14} is Ser or Aib;

A^{15} is Asp or Glu;

20 A^{16} is Val, Acc, Aib, Leu, Ile, Tle, Nle, Abu, Ala or Cha;

A^{17} is Ser, Aib or Thr;

A^{18} is Ser, Lys or Thr;

A^{19} is Tyr, Cha, Phe, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, Acc or $(X^6, X^7, X^8, X^9, X^{10})Phe$;

A^{20} is Leu, Acc, Aib, Nle, Ile; Cha, Tle, Val, Phe or $(X^6, X^7, X^8, X^9, X^{10})Phe$;

25 A^{21} is Glu or Asp;

A^{22} is Gly, Acc, β -Ala, Glu or Aib;

A^{23} is Gln, Asp, Asn or Glu;

A^{24} is Ala, Aib, Val, Abu, Tle or Acc;

A^{25} is Ala, Aib, Val, Abu, Tle, Acc, Lys, Arg, hArg, Om, $HN-CH((CH_2)_n-N(R^{10}R^{11}))-C(O)$ or $HN-$

30 $CH((CH_2)_e-X^3)-C(O)$;

A^{26} is Lys, Arg, hArg, Orn, Lys(N^e -decanoyl)), $HN-CH((CH_2)_n-N(R^{10}R^{11}))-C(O)$ or $HN-CH((CH_2)_e-X^3)-C(O)$;

A^{27} is Glu, Asp, Leu, Aib or Lys;

A^{28} is Phe, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, $(X^6, X^7, X^8, X^9, X^{10})Phe$, Aic, Acc, Aib, Cha or Trp;

35 A^{29} is Ile, Acc, Aib, Leu, Nle, Cha, Tle, Val, Abu, Ala or Phe;

A^{30} is Ala, Aib or Acc;

A^{31} is Trp, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, Phe, Acc, Aib, $(X^6, X^7, X^8, X^9, X^{10})Phe$ or Cha;

A³² is Leu, Acc, Aib, Nle, Ile, Cha, Tle, Phe, (X⁶,X⁷,X⁸,X⁹,X¹⁰)Phe or Ala;

A³³ is Val, Acc, Aib, Leu, Ile, Tle, Nle, Cha, Ala, Phe, Abu, Lys or (X⁶,X⁷,X⁸,X⁹,X¹⁰)Phe;

A³⁴ is Lys, Arg, hArg, Orn, HN-CH((CH₂)_n-N(R¹⁰R¹¹))-C(O) or HN-CH((CH₂)_e-X³)-C(O);

A³⁵ is β -Ala, D-Ala, Gaba, Ava, HN-(CH₂)_m-C(O), Aib, Acc, D-Arg or a D-amino acid;

5 A³⁶ is L- or D-Arg, D- or L-Lys, or Lys(N^e-decanoyl) or Lys(N^e-dodecanoyl) or D- or L-hArg, D- or L-Orn or HN-CH((CH₂)_n-N(R¹⁰R¹¹))-C(O), or HN-CH((CH₂)_e-X³)-C(O);

A³⁷ is Gly, β -Ala, Gaba, Aib, Acc, Act, Apc, Aun, Ava, Pro, Dhp, Dmt, Pip, 3-Hpr, 4-Hpr, L- or D-Arg, L- or D-Asp or Glu, Lys(N^e-decanoyl), Lys(N^e-dodecanoyl), Lys(N^e-octanoyl), Lys(N^e-tetradecanoyl), or Ser(O-decanoyl);

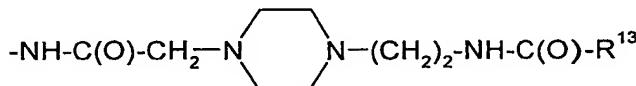
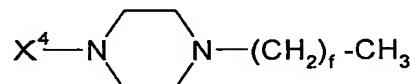
10 A³⁸ is D- or L- His, L- or D-Ala, Asn, Gln, Ser, Thr, Acc, Ado, Aib, Apc, Act, Arg, Ava, Gly, β -Ala, Gaba, or HN-(CH₂)_s-C(O);

A³⁹ is D- or L- His, L- or D-Ala, Asn, Gln, Ser, Thr, Acc, Ado, Aib, Apc, Act, Arg, Aun, Gly, β -Ala, Gaba, Lys(N^e-octanoyl), HN-(CH₂)_s-C(O), or deleted;

R¹ is OH, NH₂; (C₁-C₃₀)alkoxy, or NH-X²-CH₂-Z⁰, wherein X² is a (C₀-C₂), (C₄-C₉) or (C₁₁-C₁₉)hydrocarbon moiety and Z⁰ is H, OH, CO₂H or CONH₂;

X³

is

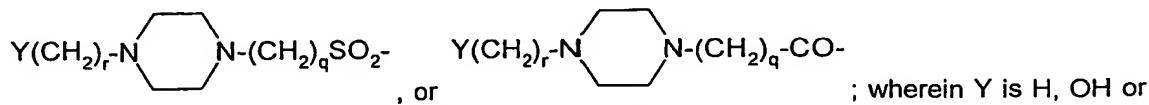


or $-C(O)-NHR^{12}$, wherein X⁴ is, independently for each occurrence, $-C(O)-$, $-NH-C(O)-$ or $-CH_2-$, and wherein f is, independently for each occurrence, an integer from 1 to 29 inclusive;

20 each of R² and R³ is independently selected from the group consisting of H, (C₁-C₃₀)alkyl, (C₂-C₃₀)alkenyl, optionally substituted phenyl(C₁-C₃₀)alkyl, optionally substituted naphthyl(C₁-C₃₀)alkyl, hydroxy(C₁-C₃₀)alkyl, hydroxy(C₂-C₃₀)alkenyl, hydroxyphenyl(C₁-C₃₀)alkyl, and hydroxynaphthyl(C₁-C₃₀)alkyl;

25 wherein the phenyl group of said optionally substituted phenyl(C₁-C₃₀)alkyl moiety, and said naphthyl group of said optionally substituted naphthyl(C₁-C₃₀)alkyl moiety each is, independently for each occurrence, substituted with 1 or more substituents selected, independently for each occurrence, from the group consisting of halo, OH, NH₂, NO₂ and CN;

or one of R² and R³ is $(CH_3)_2 - N - C^+ = N(CH_3)_2$, (C₁-C₃₀)acyl, (C₁-C₃₀)alkylsulfonyl, C(O)X⁵,



30 NH₂; r is 0 to 4; q is 0 to 4; and X⁵ is (C₁-C₃₀)alkyl, (C₂-C₃₀)alkenyl, phenyl(C₁-C₃₀)alkyl,

naphthyl(C₁-C₃₀)alkyl, hydroxy(C₁-C₃₀)alkyl, hydroxy(C₂-C₃₀)alkenyl, hydroxyphenyl(C₁-C₃₀)alkyl or hydroxynaphthyl(C₁-C₃₀)alkyl;

X⁶, X⁷, X⁸, X⁹, X¹⁰ for each occurrence is independently selected from the group consisting of H, (C₁-C₆)alkyl, OH, OR⁴, NO₂, CN, and halo;

5 R⁴ is (C₁-C₃₀)alkyl, (C₂-C₃₀)alkenyl, phenyl(C₁-C₃₀)alkyl, naphthyl(C₁-C₃₀)alkyl, hydroxy(C₁-C₃₀)alkyl, hydroxy(C₂-C₃₀)alkenyl, hydroxyphenyl(C₁-C₃₀)alkyl or hydroxynaphthyl(C₁-C₃₀)alkyl;

e is, independently for each occurrence, an integer from 1 to 4 inclusive;

m is, independently for each occurrence, an integer from 5 to 24 inclusive;

10 s is, independently for each occurrence, an integer from 5 to 10 or from 12 to 20 inclusive;

n is, independently for each occurrence, an integer from 1 to 5, inclusive;

each of R¹⁰ and R¹¹ is, independently for each occurrence, H, (C₁-C₃₀)alkyl, (C₁-C₃₀)acyl, (C₁-C₃₀)alkylsulfonyl, -C((NH)(NH₂)) or



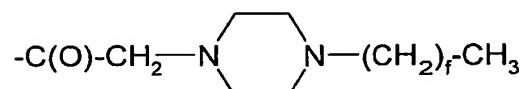
; and

15 R¹² and R¹³ each is, independently for each occurrence, (C₁-C₃₀)alkyl;

provided that:

when A⁷ is Ura, Paa or Pta, then R² and R³ are deleted;

when R¹⁰ is (C₁-C₃₀)acyl, (C₁-C₃₀)alkylsulfonyl, -C((NH)(NH₂)) or



20 , then R¹¹ is H or (C₁-C₃₀)alkyl;

(i) at least one amino acid of a compound of formula (I) is not the same as the native sequence of hGLP-1(7-38 or -39)NH₂ or hGLP-1(7-38 or -39)OH;

(ii) a compound of formula (I) is not an analogue of hGLP-1(7-38 or -39)NH₂ or hGLP-1(7-38, or -39)OH wherein a single position has been substituted by Ala;

25 (iii) a compound of formula (I) is not (Arg^{26,34}, Lys³⁸)hGLP-1(7-38)-E, (Lys²⁶(N^ε-alkanoyl))hGLP-1(7-38)-E, (Lys³⁴(N^ε-alkanoyl))hGLP-1(7-38)-E, (Lys^{26,34}-bis(N^ε-alkanoyl))hGLP-1(7-38)-E, (Arg²⁶, Lys³⁴(N^ε-alkanoyl))hGLP-1(8-38)-E, (Arg^{26,34}, Lys³⁶(N^ε-alkanoyl))hGLP-1(7-38)-E or (Arg^{26,34}, Lys³⁸(N^ε-alkanoyl))hGLP-1(7-38)-E, wherein E is -OH or -NH₂;

30 (iv) a compound of formula (I) is not Z¹-hGLP-1(7-38)-OH, Z¹-hGLP-1(7-38)-NH₂; wherein Z¹ is selected from the group consisting of:

(a) (Arg²⁶, (Arg³⁴), (Arg^{26,34}), (Lys³⁶), (Arg²⁶, Lys³⁶), (Arg³⁴, Lys³⁶), (D-Lys³⁶), (Arg³⁶), (D-Arg³⁶), (Arg^{26,34}, Lys³⁶) or (Arg^{26,36}, Lys³⁴);

- (b) (Asp²¹);
- (c) at least one of (Aib⁸), (D-A1a⁸) and (Asp⁹); and
- (d) (Tyr⁷), (N-acyl-His⁷), (N-alkyl-His⁷), (N-acyl-D-His⁷) or (N-alkyl-D-His⁷); and
- (v) a compound of formula (I) is not a combination of any two of the substitutions listed in groups (a) to (d);

5 or a pharmaceutically acceptable salt thereof.

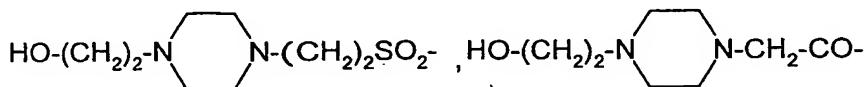
2. A compound according to claim 1, wherein A¹¹ is Thr; A¹³ is Thr; A¹⁵ is Asp; A¹⁷ is Ser; A¹⁸ is Ser or Lys; A²¹ is Glu; A²³ is Gln or Glu; A²⁷ is Glu, Leu, Aib or Lys; and A³¹ is Trp, Phe, 1Nal or 2Nal; or a pharmaceutically acceptable salt thereof.

10 3. A compound according to claim 2, wherein A⁹ is Glu, N-Me-Glu or N-Me-Asp; A¹² is Phe, Acc, 1Nal, 2Nal, or Aic; A¹⁶ is Val, Acc or Aib; A¹⁹ is Tyr, 1Nal or 2Nal; A²⁰ is Leu, Acc or Cha; A²⁴ is Ala, Aib or Acc; A²⁵ is Ala, Aib, Acc, Lys, Arg, hArg, Orn, HN-CH((CH₂)_n-N(R¹⁰R¹¹)-C(O) or HN-CH((CH₂)_e-X³)-C(O); A²⁸ is Phe, 1Nal or 2Nal; A²⁹ is Ile or Acc; A³⁰ is Ala or Aib; A³² is Leu, Acc or Cha; and A³³ is Val, Lys or Acc; or a pharmaceutically acceptable salt thereof.

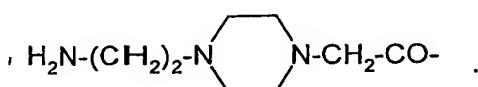
15 4. A compound according to claim 1, wherein A⁸ is Ala, Gly, Ser, D-Ala, Aib, A6c, A5c, N-Me-Ala, N-Me-D-Ala or N-Me-Gly; A¹⁰ is Gly; A¹² is Phe, 1Nal, 2Nal, A6c or A5c; A¹⁶ is Val, A6c or A5c; A²⁰ is Leu, A6c, A5c or Cha; A²² is Gly, β -Ala, Glu or Aib; A²⁴ is Ala or Aib; A²⁹ is Ile, A6c or A5c; A³² is Leu, A6c, A5c or Cha; A³³ is Val, Lys, A6c or A5c; A³⁵ is Aib, β -Ala, Ado, A6c, A5c, D-Arg or Acc; A³⁷ is Gly, Aib, β -Ala, D-Ala, Pro, Asp, Aun or D-Asp; A³⁸ is D- or L-His, Asn, Ser, Apc, Act, Gly, β -Ala or Gaba; and A³⁹ is Ser, Thr or Aib; or a pharmaceutically acceptable salt thereof.

20 5. A compound according to claim 4 or a pharmaceutically acceptable salt thereof, X⁴ for each occurrence is -C(O)-; and R¹ is OH or NH₂; or a pharmaceutically acceptable salt thereof.

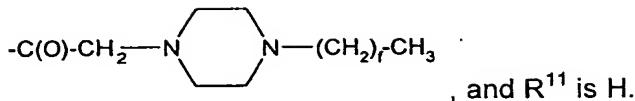
25 6. A compound according to claim 5 or a pharmaceutically acceptable salt thereof, wherein R² is H and R³ is (C₁-C₃₀)alkyl, (C₂-C₃₀)alkenyl, (C₁-C₃₀)acyl, (C₁-C₃₀)alkylsulfonyl,



or



30 7. A compound according to claim 5 or a pharmaceutically acceptable salt thereof, wherein R¹⁰ is (C₁-C₃₀)acyl, (C₁-C₃₀)alkylsulfonyl or

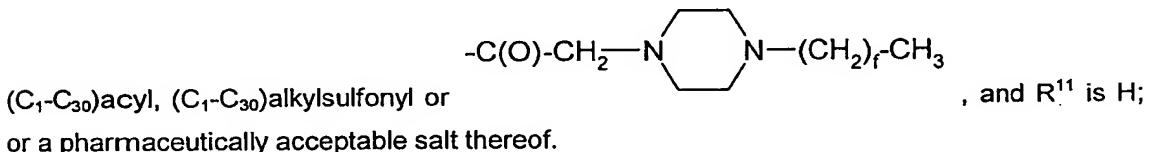


8. A compound according to claim 7 or a pharmaceutically acceptable salt thereof, wherein R^{10} is $(\text{C}_4\text{-C}_{20})\text{acyl}$, $(\text{C}_4\text{-C}_{20})\text{alkylsulfonyl}$ or



5 9. A compound according to claim 1, wherein:

A^8 is Ala, D-Ala, Aib, A6c, A5c, N-Me-Ala, N-Me-D-Ala or N-Me-Gly; A^{10} is Gly; A^{12} is Phe, 1Nal, 2Nal, A6c or A5c; A^{16} is Val, A6c or A5c; A^{20} is Leu, A6c, A5c or Cha; A^{22} is Gly, β -Ala, Glu or Aib; A^{24} is Ala or Aib; A^{29} is Ile, A6c or A5c; A^{32} is Leu, A6c, A5c or Cha; A^{33} is Val, Lys, A6c or A5c; A^{35} is Aib, β -Ala, Ado, A6c, A5c or D-Arg; and A^{37} is Gly, Aib, β -Ala, D-Ala, Pro or 10 D-Asp; A^{38} is D- or L- His, Asn, Ser, Gly, β -Ala or Gaba; and A^{39} is Ser, or deleted; X^4 for each occurrence is $-\text{C}(\text{O})-$; e for each occurrence is independently 1 or 2; R^1 is OH or NH_2 ; R^{10} is



or a pharmaceutically acceptable salt thereof.

10. A compound according to claim 9, wherein R^{10} is $(\text{C}_4\text{-C}_{20})\text{acyl}$, $(\text{C}_4\text{-}$

15 $\text{C}_{20})\text{alkylsulfonyl}$ or

$$-\text{C}(\text{O})\text{-CH}_2\text{-N}(\text{C}_7\text{H}_14)\text{N}-(\text{CH}_2)_f\text{CH}_3$$

, or a pharmaceutically

acceptable salt thereof.

11. A compound according to claim 1 wherein said compound is according to the formula:

- (Aib^{8,35}, Arg^{26,34}, Phe³¹, Pro³⁷, Ser^{38,39})hGLP-1(7-39)- NH₂;
- 20 (Aib^{8,35,37}, Arg^{26,34}, Phe³¹, Asn³⁸)hGLP-1(7-38)- NH₂;
- (Aib^{8,35,37}, Arg^{26,34}, Phe³¹, Ser³⁸)hGLP-1(7-38) NH₂;
- (Aib^{8,35,37}, Gaba³⁸)hGLP-1(7-38) NH₂;
- (Aib^{8,35,37}, Arg^{26,34}, Phe³¹, His³⁸)hGLP-1(7-38) NH₂;
- (Aib^{8,35}, Arg^{26,34}, Phe³¹, β -Ala³⁷, His³⁸)hGLP-1(7-38) NH₂;
- 25 (Aib^{8,35,37}, Arg^{26,34}, D-His³⁸)hGLP-1(7-38) NH₂;
- (Aib^{8,35,37}, β -Ala³⁸)hGLP-1(7-38) NH₂;
- (Aib^{8,35}, Arg^{26,34}, β -Ala³⁷, His³⁸)hGLP-1(7-38) NH₂;
- (Aib^{8,35,37}, Arg^{26,34}, Phe³¹, Gly³⁸)hGLP-1(7-38) NH₂;
- (Aib^{8,35,37}, Arg^{26,34}, Gly³⁸)hGLP-1(7-38) NH₂;

(Aib^{8,35,37}, Arg^{26,34}, β -Ala³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg^{26,34}, Gaba³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg³⁴, Phe³¹, His³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg^{26,34}, His³⁸)hGLP-1(7-38) NH₂;

5 (Aib^{8,35,37}, Arg^{26,34}, Phe³¹, Gaba³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg^{26,34}, Phe³¹, Ava³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg^{26,34}, Ava³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg³⁴, Phe³¹, D-His³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg³⁴, Phe³¹, Gly³⁸)hGLP-1(7-38) NH₂;

10 (Aib^{8,35,37}, Gly³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg^{26,34}, Phe³¹, D-His³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35}, Arg^{26,34}, Phe³¹, β -Ala³⁷, D-His³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35,37}, Arg^{26,34}, Phe³¹, β -Ala³⁸)hGLP-1(7-38) NH₂;
(Aib^{8,35}, Arg^{26,34}, Phe³¹, β -Ala^{37,38})hGLP-1(7-38) NH₂;

15 (Aib^{8,35,37}, Arg³⁴, Phe³¹, β -Ala³⁸)hGLP-1(7-38) NH₂; or
(Aib^{8,35,37}, Arg³⁴, Phe³¹, Gaba³⁸)hGLP-1(7-38) NH₂;
or a pharmaceutically acceptable salt thereof.

12. A pharmaceutical composition comprising an effective amount of a compound according to claim 1 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier or diluent.

13. A method of eliciting an agonist effect from a GLP-1 receptor in a subject in need thereof which comprises administering to said subject an effective amount of a compound according to claim 1 or a pharmaceutically acceptable salt thereof.

14. A method of treating a disease selected from the group consisting of Type I diabetes, Type II diabetes, obesity, glucagonomas, secretory disorders of the airway, metabolic disorder, arthritis, osteoporosis, central nervous system disease, restenosis, neurodegenerative disease, renal failure, congestive heart failure, nephrotic syndrome, cirrhosis, pulmonary edema, hypertension, treatment of respiratory distress, disorders wherein the reduction of food intake is desired, hypoglycemia and malabsorption syndrome associated with gastroectomy or small bowel resection, in a subject in need thereof which comprises administering to said subject an effective amount of a compound according to claim 1 or a pharmaceutically acceptable salt thereof.

15. A method according to claim 14 wherein said disease is Type I diabetes or Type II diabetes.

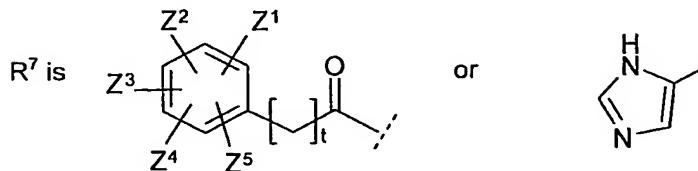
35 16. A compound of formula (II),

$R^7-A^8-A^9-A^{10}-A^{11}-A^{12}-A^{13}-A^{14}-A^{15}-A^{16}-A^{17}-A^{18}-A^{19}-A^{20}-A^{21}-A^{22}-A^{23}-A^{24}-A^{25}-A^{26}-A^{27}-A^{28}-A^{29}-A^{30}-A^{31}-A^{32}-A^{33}-A^{34}-A^{35}-A^{36}-A^{37}-A^{38}-A^{39}-R^1$,

(II)

wherein

5



10

A^8 is Ala, β -Ala, Gly, Ser, D-Ala, Aib, Acc, N-Me-Ala, N-Me-D-Ala or N-Me-Gly;

A^9 is Glu, N-Me-Glu, N-Me-Asp or Asp;

A^{10} is Gly, Acc, β -Ala or Aib;

A^{11} is Thr or Ser;

15 A^{12} is Phe, Acc, Aic, Aib, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, Cha, Trp or $(X^6, X^7, X^8, X^9, X^{10})Phe$;

A^{13} is Thr or Ser;

A^{14} is Ser or Aib;

A^{15} is Asp or Glu;

A^{16} is Val, Acc, Aib, Leu, Ile, Tle, Nle, Abu, Ala or Cha;

20 A^{17} is Ser, Aib or Thr;

A^{18} is Ser, Lys or Thr;

A^{19} is Tyr, Cha, Phe, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, Acc or $(X^6, X^7, X^8, X^9, X^{10})Phe$;

A^{20} is Leu, Acc, Aib, Nle, Ile, Cha, Tle, Val, Phe or $(X^6, X^7, X^8, X^9, X^{10})Phe$;

A^{21} is Glu or Asp;

25 A^{22} is Gly, Acc, β -Ala, Glu or Aib;

A^{23} is Gln, Asp, Asn or Glu;

A^{24} is Ala, Aib, Val, Abu, Tle or Acc;

A^{25} is Ala, Aib, Val, Abu, Tle, Acc, Lys, Arg, hArg, Orn, $HN-CH((CH_2)_n-N(R^{10}R^{11}))-C(O)$ or $HN-CH((CH_2)_n-X^3)-C(O)$;

30 A^{26} is Lys, Arg, hArg, Orn, Lys(N^ε-decanoyl)), $HN-CH((CH_2)_n-N(R^{10}R^{11}))-C(O)$ or $HN-CH((CH_2)_n-X^3)-C(O)$;

A^{27} is Glu Asp, Leu, Aib or Lys;

A^{28} is Phe, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, $(X^6, X^7, X^8, X^9, X^{10})Phe$, Aic, Acc, Aib, Cha or Trp;

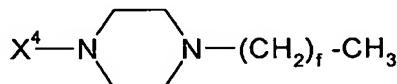
A^{29} is Ile, Acc, Aib, Leu, Nle, Cha, Tle, Val, Abu, Ala or Phe;

35 A^{30} is Ala, Aib or Acc;

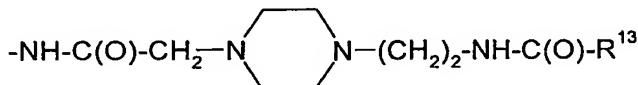
A^{31} is Trp, 2-Pal, 3-Pal, 4-Pal, 1Nal, 2Nal, Phe, Acc, Aib, $(X^6, X^7, X^8, X^9, X^{10})Phe$ or Cha;

A^{32} is Leu, Acc, Aib, Nle, Ile, Cha, Tle, Phe, $(X^6, X^7, X^8, X^9, X^{10})Phe$ or Ala;

A³³ is Val, Acc, Aib, Leu, Ile, Tle, Nle, Cha, Ala, Phe, Abu, Lys or (X⁶,X⁷,X⁸,X⁹,X¹⁰)Phe;
 A³⁴ is Lys, Arg, hArg, Orn, HN-CH((CH₂)_n-N(R¹⁰R¹¹))-C(O) or HN-CH((CH₂)_e-X³)-C(O);
 A³⁵ is β -Ala, D-Ala, Gaba, Ava, HN-(CH₂)_m-C(O), Aib, Acc, D-Arg, a D-amino acid or deleted;
 A³⁶ is L- or D-Arg, D- or L-Lys, or Lys(N^e-decanoyl) or Lys(N^e-dodecanoyl) or D- or L-hArg,
 5 D- or L-Orn or HN-CH((CH₂)_n-N(R¹⁰R¹¹))-C(O), HN-CH((CH₂)_e-X³)-C(O), or deleted;
 A³⁷ is Gly, β -Ala, Gaba, Aib, Acc, Act, Apc, Aun, Ava, Pro, Dhp, Dmt, Pip, 3-Hpr, 4-Hpr, L- or
 D- Arg, L- or D- Asp or Glu, Lys(N^e-decanoyl), Lys(N^e-dodecanoyl), Lys(N^e-octanoyl),
 Lys(N^e-tetradecanoyl), Ser(O-decanoyl), or deleted;
 A³⁸ is D- or L- His, L- or D-Ala, Asn, Gln, Ser, Thr, Acc, Ado, Aib, Apc, Act, Arg, Ava, Gly, β -
 10 Ala, Gaba, HN-(CH₂)_s-C(O), or deleted;
 A³⁹ is D- or L- His, L- or D-Ala, Asn, Gln, Ser, Thr, Acc, Ado, Aib, Apc, Act, Arg, Aun, Gly, β -
 Ala, Gaba, Lys(N^e-octanoyl), HN-(CH₂)_s-C(O), or deleted;
 R¹ is OH, NH₂; (C₁-C₃₀)alkoxy, or NH-X²-CH₂-Z⁰, wherein X² is a (C₀-C₂₀)hydrocarbon moiety
 and Z⁰ is H, OH, CO₂H or CONH₂;



15 X³ is



or -C(O)-NHR¹², wherein X⁴ is, independently for each occurrence, -C(O)-, -NH-C(O)- or -CH₂-; and wherein f is, independently for each occurrence, an integer from 1 to 29 inclusive; X⁶,X⁷,X⁸,X⁹,X¹⁰ for each occurrence is independently selected from the group consisting of H,

20 (C₁-C₆)alkyl, OH, OR⁴, NO₂, CN, and halo;

R⁴ is (C₁-C₃₀)alkyl, (C₂-C₃₀)alkenyl, phenyl(C₁-C₃₀)alkyl, naphthyl(C₁-C₃₀)alkyl, hydroxy(C₁-C₃₀)alkyl, hydroxy(C₂-C₃₀)alkenyl, hydroxyphenyl(C₁-C₃₀)alkyl or hydroxynaphthyl(C₁-C₃₀)alkyl; Z¹,Z²,Z³,Z⁴,Z⁵ for each occurrence is independently selected from the group consisting of H, (C₁-C₆)alkyl, OH, OR⁴, NO₂, CN, and halo; Z¹ and Z² can joint together to form a ring system;

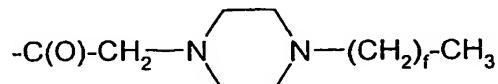
25 e is, independently for each occurrence, an integer from 1 to 4 inclusive;

m is, independently for each occurrence, an integer from 5 to 24 inclusive;

n is, independently for each occurrence, an integer from 1 to 5, inclusive;

t is, independently for each occurrence, an integer from 0 to 4, inclusive;

each of R¹⁰ and R¹¹ is, independently for each occurrence, H, (C₁-C₃₀)alkyl, (C₁-C₃₀)acyl, (C₁-



30 C₃₀)alkylsulfonyl, -C((NH)(NH₂)) or ; and

R¹² and R¹³ each is, independently for each occurrence, (C₁-C₃₀)alkyl;

provided that:

R⁷ is not C(O)X¹¹, wherein X¹¹ is phenyl(C₁-C₃₀)alkyl, naphthyl(C₁-C₃₀)alkyl, hydroxy(C₁-C₃₀)alkyl, hydroxy(C₂-C₃₀)alkenyl, hydroxyphenyl(C₁-C₃₀)alkyl or hydroxynaphthyl(C₁-C₃₀)alkyl;

5 when R¹⁰ is (C₁-C₃₀)acyl, (C₁-C₃₀)alkylsulfonyl, -C((NH)(NH₂)) or



, then R¹¹ is H or (C₁-C₃₀)alkyl;

or a pharmaceutically acceptable salt thereof.

17. A compound according to claim 16, wherein A¹¹ is Thr; A¹³ is Thr; A¹⁵ is Asp; A¹⁷ is Ser; A¹⁸ is Ser or Lys; A²¹ is Glu; A²³ is Gln or Glu; A²⁷ is Glu, Leu, Aib or Lys; and A³¹ is 10 Trp, Phe, 1Nal or 2Nal; or a pharmaceutically acceptable salt thereof.

18. A compound according to claim 17, A⁷ is 4-imidazol-carbonyl, 4-nitrophenyl-15 acetyl, 3-chloro-4-hydroxyphenyl-acetyl, 4-hydroxyphenyl-acetyl, 3-(4-aminophenyl)-propionyl, 3-(4-nitrophenyl)-propionyl, 3-(3,4-difluorophenyl)-propionyl, 3-fluoro-4-hydroxyphenyl-acetyl or 4-aminophenyl-acetyl; A⁹ is Glu, N-Me-Glu or N-Me-Asp; A¹² is Phe, Acc, 1Nal, 2Nal, or Aic; A¹⁶ is Val, Acc or Aib; A¹⁹ is Tyr, 1Nal or 2Nal; A²⁰ is Leu, Acc or Cha; A²⁴ is Ala, Aib or Acc; A²⁵ is Ala, Aib, Acc, Lys, Arg, hArg, Orn, HN-CH((CH₂)_n-N(R¹⁰R¹¹))-C(O) or HN-CH((CH₂)_e-X³)-C(O); A²⁸ is Phe, 1Nal or 2Nal; A²⁹ is Ile or Acc; A³⁰ is Ala or Aib; A³² is Leu, Acc or Cha; and A³³ is Val, Lys or Acc; or a pharmaceutically acceptable salt thereof.

19. A compound according to claim 18, wherein A⁸ is Ala, Gly, Ser, D-Ala, Aib, 20 A6c, A5c, N-Me-Ala, N-Me-D-Ala or N-Me-Gly; A¹⁰ is Gly; A¹² is Phe, 1Nal, 2Nal, A6c or A5c; A¹⁶ is Val, A6c or A5c; A²⁰ is Leu, A6c, A5c or Cha; A²² is Gly, β -Ala, Glu or Aib; A²⁴ is Ala or Aib; A²⁹ is Ile, A6c or A5c; A³² is Leu, A6c, A5c or Cha; A³³ is Val, Lys, A6c or A5c; A³⁵ is Aib, β -Ala, Ado, A6c, A5c, D-Arg, Acc or Gly; A³⁷ is Gly, Aib, β -Ala, D-Ala, Pro, Asp, Aun or D-Asp; A³⁸ is D- or L- His, Asn, Ser, Apc, Act, Gly, β -Ala or Gaba; and A³⁹ is Ser, Thr or Aib; or a 25 pharmaceutically acceptable salt thereof.

20. A compound according to claim 19 or a pharmaceutically acceptable salt thereof, wherein X⁴ for each occurrence is -C(O)-; and R¹ is OH or NH₂; or a pharmaceutically acceptable salt thereof.

21. A compound according to claim 16 wherein A⁸ is Ala, D-Ala, Aib, A6c, A5c, N-30 Me-Ala, N-Me-D-Ala or N-Me-Gly; A¹⁰ is Gly; A¹² is Phe, 1Nal, 2Nal, A6c or A5c; A¹⁶ is Val, A6c or A5c; A²⁰ is Leu, A6c, A5c or Cha; A²² is Gly, β -Ala, Glu or Aib; A²⁴ is Ala or Aib; A²⁹ is Ile, A6c or A5c; A³² is Leu, A6c, A5c or Cha; A³³ is Val, Lys, A6c or A5c; A³⁵ is Aib, β -Ala, Ado, A6c, A5c D-Arg or Gly; and A³⁷ is Gly, Aib, β -Ala, D-Ala, Pro or D-Asp; A³⁸ is D- or L- His, Asn, Ser, Gly, β -Ala or Gaba; and A³⁹ is Ser, or deleted; X⁴ for each occurrence is -C(O)-; e 35 for each occurrence is independently 1 or 2; R¹ is OH or NH₂; R¹⁰ is (C₁-C₃₀)acyl, (C₁-

$$-C(O)-CH_2-N\begin{array}{c} \text{C}_6\text{H}_4 \\ | \\ \text{C}_6\text{H}_4 \end{array} N-(CH_2)_f-CH_3$$
, and R^{11} is H; or a
 C_{30} alkylsulfonyl or pharmaceutically acceptable salt thereof.

22. A compound according to claim 21 wherein R^{10} is (C_4-C_{20}) acyl, (C_4-C_{20}) alkylsulfonyl or

5 pharmaceutically acceptable salt thereof.

23. A compound according to claim 16 wherein said compound is
 $(4Hppa^7)GLP-1(7-36)NH_2$;
 $(3Hppa^7)GLP-1(7-36)NH_2$;
 $(phenylacetyl^7)hGLP-1(7-36)NH_2$;
10 $((3\text{-fluoro-4\text{-hydroxyphenyl\text{-}acetyl}}^7)hGLP-1(7-36)NH_2$;
 $((4\text{-imidazol\text{-}carbonyl}}^7)hGLP-1(7-36) NH_2$;
 $((4\text{-nitrophenyl\text{-}acetyl}}^7)hGLP-1(7-36) NH_2$;
 $((3\text{-chloro-4\text{-hydroxyphenyl\text{-}acetyl}}^7)hGLP-1(7-36) NH_2$;
 $((4\text{-hydroxyphenylacetyl}}^7)hGLP-1(7-36) NH_2$;
15 $((4\text{-aminophenyl\text{-}acetyl}}^7)hGLP-1(7-36) NH_2$;
 $((3\text{-}(3\text{-hydroxyphenyl\text{-}propionyl}}^7)hGLP-1(7-36) NH_2$;
 $((3\text{-phenyl\text{-}propionyl}}^7)hGLP-1(7-36) NH_2$;
 $((3\text{-}(4\text{-aminophenyl\text{-}propionyl}}^7)hGLP-1(7-36) NH_2$;
 $((3\text{-}(4\text{-nitrophenyl\text{-}propionyl}}^7)hGLP-1(7-36) NH_2$;
20 $((3\text{-}(2\text{-hydroxyphenyl\text{-}propionyl}}^7)hGLP-1(7-36) NH_2$;
 $((3\text{-}(3,4\text{-difluorophenyl\text{-}propionyl}}^7)hGLP-1(7-36) NH_2$; or
 $((3\text{-}(2,4\text{-dihydroxyphenyl\text{-}propionyl}}^7)hGLP-1(7-36) NH_2$;
or a pharmaceutically acceptable salt thereof.

24. A pharmaceutical composition comprising an effective amount of a compound according to claim 16 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier or diluent.

25. A method of eliciting an agonist effect from a GLP-1 receptor in a subject in need thereof which comprises administering to said subject an effective amount of a compound according to claim 16 or a pharmaceutically acceptable salt thereof.

30 26. A method of treating a disease selected from the group consisting of Type I diabetes, Type II diabetes, obesity, glucagonomas, secretory disorders of the airway, metabolic disorder, arthritis, osteoporosis, central nervous system disease, restenosis, neurodegenerative disease, renal failure, congestive heart failure, nephrotic syndrome,

5 cirrhosis, pulmonary edema, hypertension, treatment of respiratory distress, disorders wherein the reduction of food intake is desired, hypoglycemia and malabsorption syndrome associated with gastroectomy or small bowel resection, in a subject in need thereof which comprises administering to said subject an effective amount of a compound according to claim 16 or a pharmaceutically acceptable salt thereof.

27. A method according to claim 26 wherein said disease is Type I diabetes or Type II diabetes.